

## Part II. DS0 Channel Transmit

The 440B can send data, VF tones, telephone numbers, and generate winks into individual DS0 channels. Because the 440B provides two nearly identical transmitters, it should be noted that telephone numbers and winks can only be sent by transmitter #1 (XMTR 1). For this reason, Wink and Phone No. are printed in red to match with XMTR 1 on the front panel.

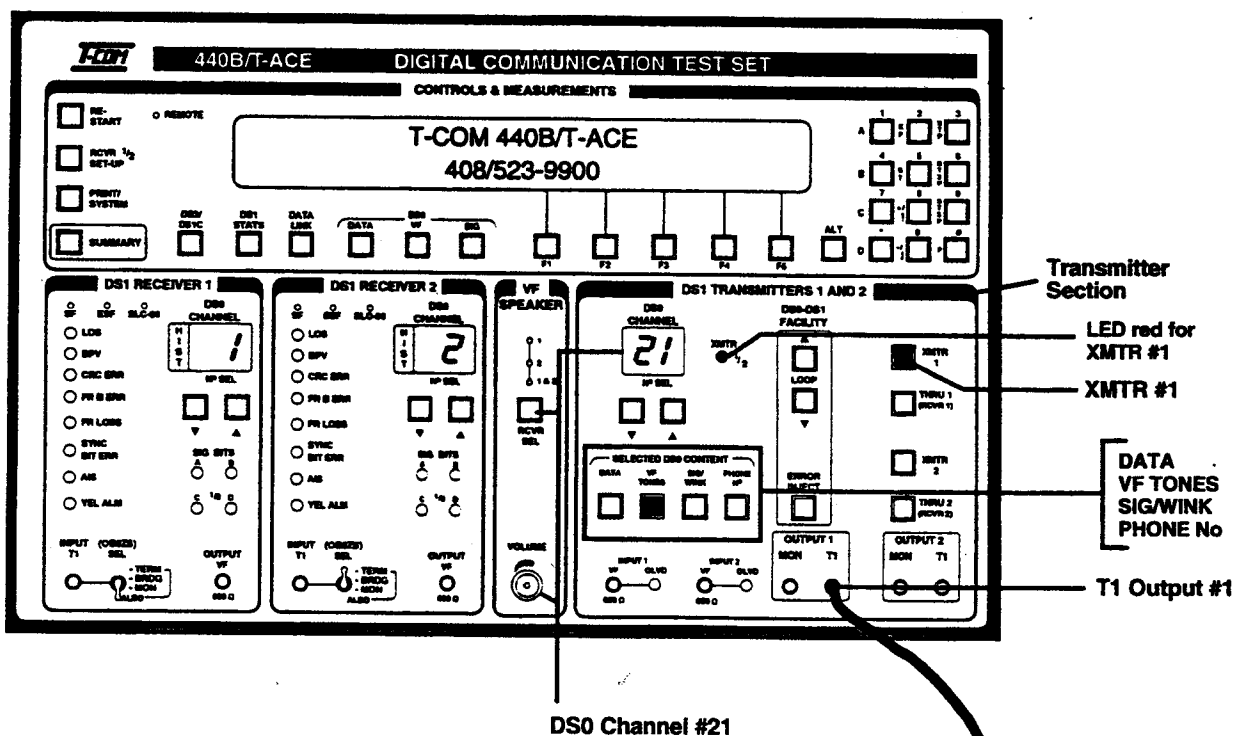
In order to use the DS0 transmitter keys labeled **DATA**, **VF TONES**, **SIG/WINK**, and **PHONE No**, the transmitter(s) must first be Set-Up in a **CHANNELIZED** mode (see Transmitter Set-Up Quick Sheets).

The 440B supports out-of-service testing as well as drop-and-insert. Using the transmitter section involves breaking into a DS1/T1 circuit, generally via DSX jacks. Before breaking into a DS1 circuit, T-COM recommends that the circuit first be monitored with the DS1 receivers to verify that there is no customer traffic on the circuit. This will prevent accidentally interrupting customer activity. (For example, using the signaling bit display described on pg 7 of QS5 can quickly show idle/busy status of the trunks.)

It is also important to note that the 440B provides two separate transmitters and therefore there are two sets of transmitter jack outputs (labeled red and green corresponding to XMTR 1 and XMTR 2.) Generally, the jack outputs labeled T1 are used for circuit testing since they provide 0 dBDSX level.

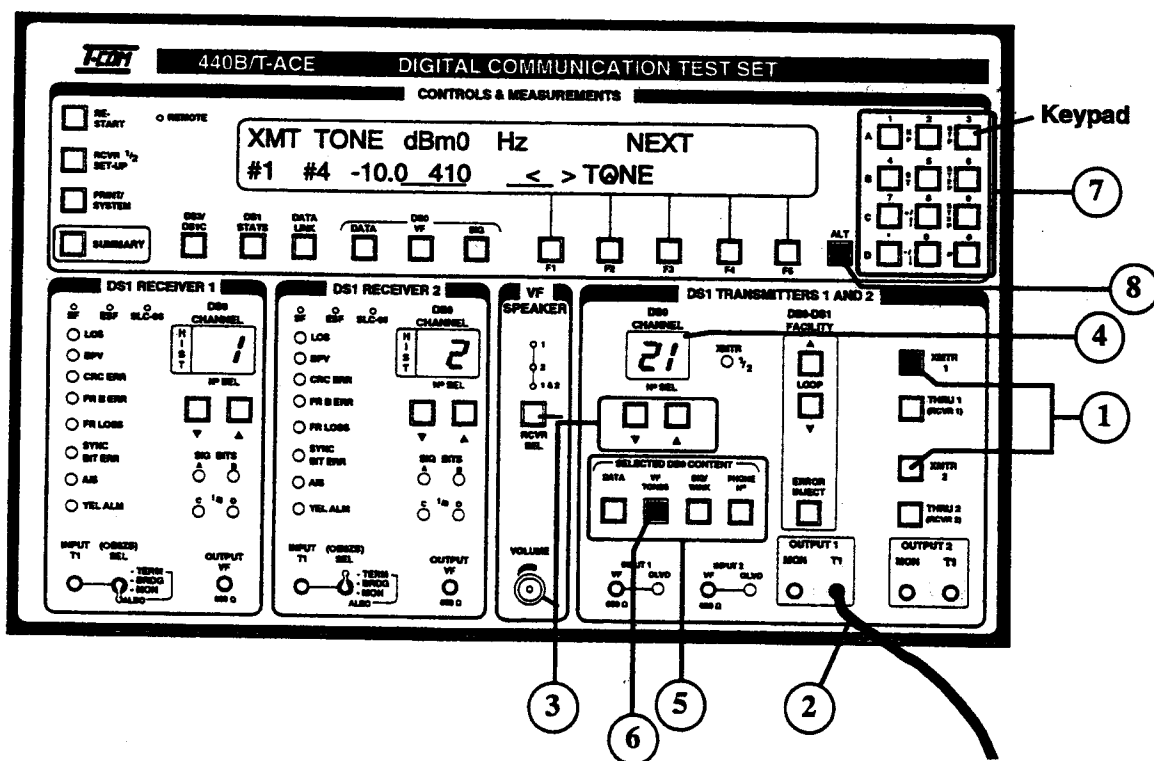
When using the DS0 transmitter function keys (**DATA**, **VF TONES**, **SIG/WINK**, **PHONE No**), keep in mind that you are controlling either XMTR 1 or XMTR 2, depending on which XMTR key is lit, and the **XMTR-LED** color.

In the picture below the lit function keys indicate that Transmitter #1 is sending VF Tones into DS0 Channel #21.



1. Verify whether transmitter 1 or 2 is to be used by checking whether XMTR 1 or XMTR 2 key is lit. (Press the desired XMTR key if it is not lit.)
2. Verify that the patchcord is plugged into the correct jack OUTPUT (notice that Output 1 is used since we are using Transmitter #1). Generally the T1 jack is used.
3. Select the desired DS0 Channel (1 to 24) using either selector keys (labeled ▼ ▲). Selected DS0 content will be sent in this channel.
4. If no number appears in the DS0 Channel read-out, the transmitter is not in a CHANNELIZED mode. Trying to dial to a specific channel or select the DS0 keys labeled DATA, VF TONES, SIG/WINK, PHONE No. will cause a reminder screen to display:

**See individual screens for DATA, VF TONES, SIG/WINK, and PHONE No on the following pages.**



## VF Tones

### Sending VF tones

The 440B provides 16 factory pre-set tones. All tones can be easily edited, and are automatically saved even when the set is turned off.

Since it is sometimes important to set signaling bit states when sending tones, refer to SIG/WINK section (pg 7) for setting signaling bit status.

- Press the VF TONES key to display tone screen:

XMT	TONE	dBm0	Hz	NEXT
#1	#4	-10.0	410	< > TONE

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This screen indicates the tone currently being sent in the selected transmitter and its corresponding DS0 channel.

XMT	TONE	dBm0	Hz	NEXT
#1	#4	-10.0	410	< > TONE

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- XMT#1 indicates that transmitter #1 is selected
- Level is -10.0 dBm0
- Frequency is 410 Hz
- Use NEXT TONE softkey (F5) to scroll through 16 preset tones. (TONE #4 is selected in screen)

- To edit a tone, use the < > softkeys (F3,F4) to move the flashing underline to the digit to be changed, and enter new digits with the keypad. For example in screen below we have changed tone #4 to 1004 Hz at 0.0 dBm0.

XMT	TONE	dBm0	Hz	NEXT
#1	#4	0.0	1004	< > TONE

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Alternatively, use the < > softkeys to move the blinking underline and use the delta symbol (F2) to scroll quickly through levels and frequencies. Changes are automatically saved (even if the test set is turned off).

- To reverse the direction of the delta scroll, or the NEXT TONE scroll, press the green ALT key first. This changes NEXT TONE to PREV TONE and changes the direction of the delta scroll. When the ALT key is lit (green) the delta scroll goes "up" on level and "down" on frequency.

This concludes the VF Tones Quick Sheets.

## Telephone Numbers (Requires Option 06)

Sending Telephone Numbers (Transmitter #1 only)

### A. Direct Dialing from Keypad

9. Press the **PHONE No.** key to display the opening menu screen. If this screen is not displayed, press the key a second time:

XMT PHONE DIRECT PROGRAMMED  
#1 NO. EDIT < > ENTR

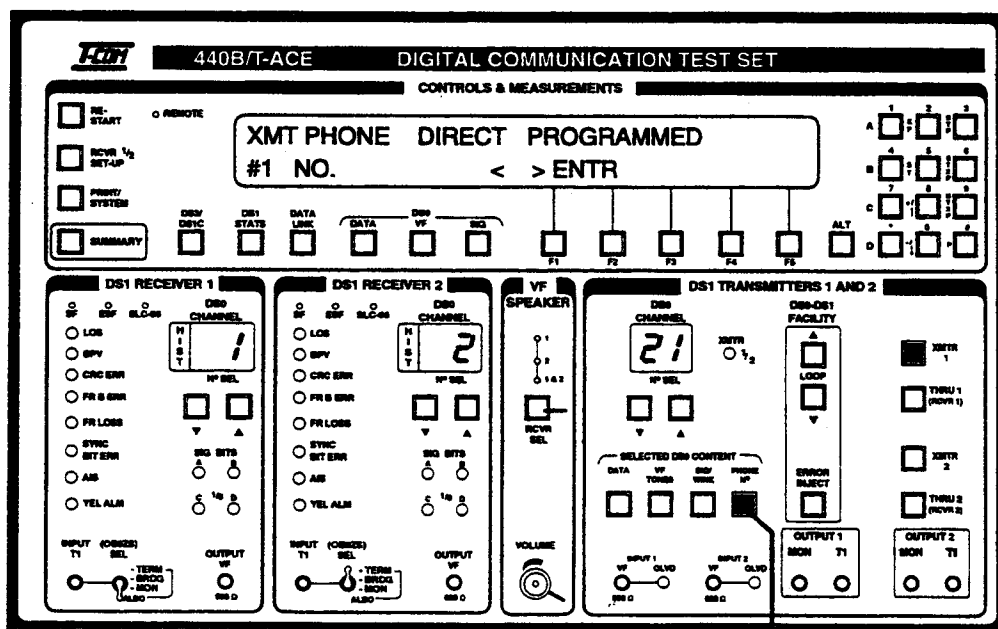


**NOTE:** EDIT provides screens for verifying and changing telephone number parameters which vary depending on whether MF, DTMF, or Dial Pulse is used. See section Editing Telephone Numbers on page 11/17.

10. Use the < > softkeys (F3, F4) to underline **DIRECT**.

11. Press ENTER to display the direct dial screen:

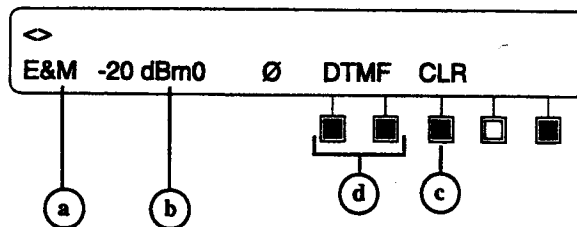
E&M -20 dBm0 Ø DTMF CLR



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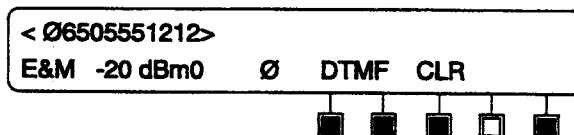
### A. Direct Dialing from Keypad (cont.)

Description of the direct dial screen:



- a) E&M signaling is selected
- b) Digits will be sent at -20 dBm0 level
- c) Use the DTMF/MF/DP softkey to change the digit format.
- d) Use the ↓ ↑ softkeys for On/Off Hook

12. Use the ↓ ↑ softkeys (F1, F2) to enter ON/OFF hook status, and use the keypad to enter digits. Digits and ON/OFF hook status are sent immediately when entered, and will appear on screen:



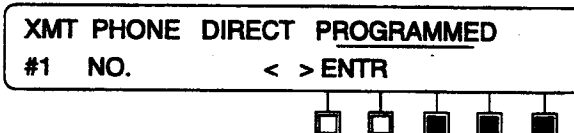
13. Press the CLR softkey (F5) to clear the screen and enter new digits.
14. To exit, or return to the telephone number screen, press the PHONE No. function key (see step 9) on the front panel.

**Note:** The 440B will only accept new Dial Pulse digit entries when outpulsing of all previously entered digits is complete.

### B. Using Pre-Programmable Telephone Sequences

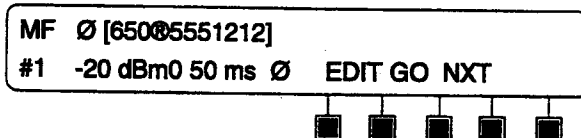
Equal Access, Feature Group D, 800, and interlata testing require sending two or three batches of telephone strings in a row. Pre-programming these sequences into the 16 memory locations is an ideal method of setting up telephone numbers, kick codes, customer ANI, and credit card numbers.

15. Press the PHONE No. function key to display the opening telephone number screen. If this screen does not display, press the key a second time:



16. Use the < > softkeys to underline PROGRAMMED.

17. Press the ENTR softkey (F5) to access up to 16 pre-programmed telephone number screens:

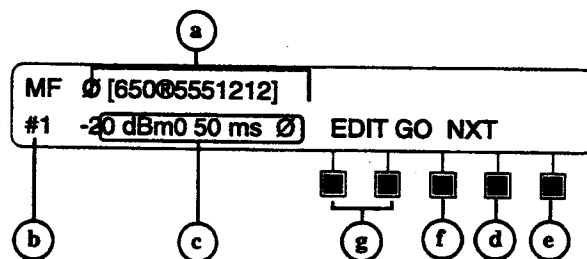


18. Use the NXT softkey to scroll to the desired program (1-16), and press the GO softkey to send digits. An underline will move across the screen to indicate that digits are being transmitted.

**NOTE:** EDIT provides menus for changing a variety of parameters, depending on whether the number is MF, DTMF or DP. See APPENDIX TO TELEPHONE NUMBERS for specific EDIT screens.

### B. Using Pre-Programmable Telephone Sequences

Description of pre-programmed telephone sequence screen:



- a) MF digits 415 555 1212, with ON/OFF hook KP and ST commands
- b) #1 indicates this is number 1 of 16 programmed sequences
- c) Digits will be sent at -20 dBm0 level, timed 50ms apart from one another.
- d) Press the GO softkey to send numbers.
- e) Use NXT to scroll through 16 telephone numbers
- f) Use EDIT softkey to edit telephone numbers
- h) If a W (wait-for-wink) is entered, the 440B will wait for a wink response before it continues outpulsing
- g) Manual On/Off hook control

#### Symbol Key for Telephone No. screens

↓ = On Hook	= = ST2P
↑ = Off Hook	≡ = ST3P
[ = KP	W = Wait-for-wink
] = ST	↕ = Transition state - FXS/GS
- = STP	♦ = 1 sec pause

This concludes the Telephone Number Quick Sheets. See Editing Telephone Numbers on page 11.

## Signaling and Wink

The Signaling capability allows setting the A/B/C/D signaling bits while sending tones. The wink capability provides for automatic multiple Wink generation for emulating digital switch or PBX operation when setting up a series of telephone calls.

### A. Signaling Bits

### B. Wink Generation - XMTR #1 only (Requires Option 06)

#### A. Setting Signaling Bits

19. Press SIG/WINK function key to display main menu screen. Note that [AB:11] means signaling states are currently set to A = 1, B = 1:

<u>XMT SIG STATES</u>	WINK OR CUT-THRU
#1 [AB:11]	< > EDIT

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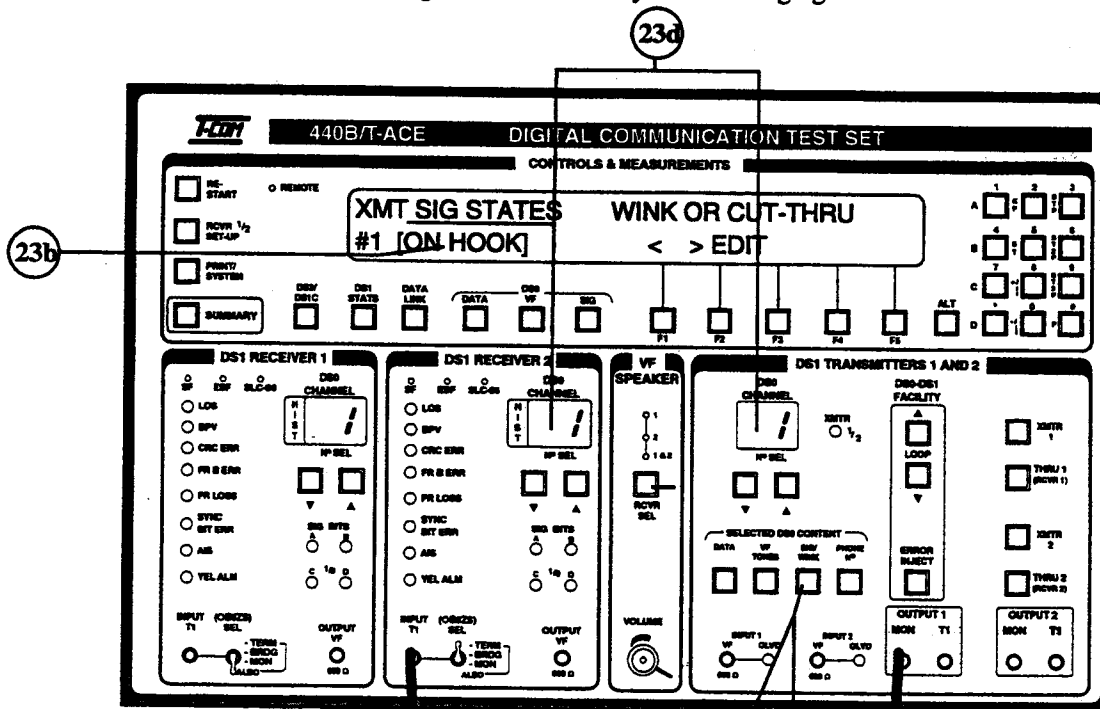
20. Verify that SIG STATES is underlined, and press EDIT to change signaling bit states:

- a) If SF framing is used, verify the screen reads:

<u>XMT SIG STATES</u>	A	B	SLC/SF?
#1	0	0	NO

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NOTE: The above screen shows that the A and B signaling states are set to 0. When testing Shelves B, C, and D in a SLC-96 system, depress the F3 softkey which changes NO to YES. This permits the selection of the "T" (toggle) state, which is an alternating 0/1 state, normally used for ringing.



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440B/T-ACE - Quick Sheet 5A

- b. If ESF framing is used, verify the screen reads:

XMT SIG STATES	A	B	C	D
#1	0	0	0	NXT

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21. Use the softkeys (F1 through F4) to change states from 0, 1, or T for A/B signaling bits. (Press softkeys repeatedly to run through settings, for example A=1, B=0.
22. Press NXT to return to the main menu screen in step 19. This screen will reflect changed signaling states. Note: C and D signaling bits will only appear for ESF framing. T (toggle) will only appear for SLC-96 framing, and is used for 9-state signaling.

#### B. Setting automatic Wink generation (Transmitter #1 only; requires Option 06)

The 440B can automatically generate wink responses to incoming seizures, ST, STP, ST2P and ST3P commands, captured by Receiver #2.

23. Press SIG/WINK, a message is displayed as a reminder that only receiver #2 can be used to capture seizures and STs.

RCVR#2 HAS BEEN SELECTED TO RECEIVE  
SEIZURE - SET PATCH CORDS IF NEEDED

- a) Press SIG/WINK if necessary to display the following screen.

XMT SIG STATES	WINK OR CUT-THRU
#1 [ON HOOK]	< > EDIT

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- b) Note that supervision status of RCVR #2, DS0 Channel #1 is displayed in the screen above..
- c) Remember that only RCVR #2 can be used to capture seizure/ST's.
- d) Verify that the DS0 Channels are the same in the transmitter & the receiver.

#### To Edit WINK settings

There are three winks to configure. The first wink will respond to the initial off hook seizure. Wink #2 and #3 can be programmed to respond to either the first, second, or third STs ( ). Each wink can be set with individual delays and durations. Automatic cut-thru winks are generated in response to STP, ST2P, ST3P commands.



24. Press the EDIT softkey to display the edit screen:

WINK	AB	AB			
SIG STATES	Ø:00	:11	<	>	NXT

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25. Press the NXT to display the wink timing screen:

WINK	DELAY	DURATION	[10 to 990 ms]		
#1	300	200	<	>	NXT

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26. Use the < > softkeys and the keypad to enter values, then press the NXT softkey to display the Wink Enable screen:

WINK	WINK	<u>ENABLED</u> / DISABLED			
#2		<	>	NXT	

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27. Use the < > softkeys to underline ENABLED or DISABLED to enable or disable the second Wink, then press NXT to display:

WINK	GENERATE	2nd WINK	AFTER		
#2	[1st / <u>2nd</u> ]	ST	<	>	NXT

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28. Use the < > to underline 1st or 2nd. This will determine when the second Wink is to be sent. Press NXT to display the Wink #2 screen:

WINK	DELAY	DURATION	[10 to 990 ms]		
#2	300	200	<	>	NXT

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29. Use the < > softkeys and the Keypad to enter values. Then press NXT to display the Wink #3 screen:

WINK	WINK	<u>ENABLED</u> /DISABLED			
#3		<	>	NXT	

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30. Use the < > softkeys to underline enabled or disabled, then press NXT to display:

WINK GENERATE 2nd WINK AFTER  
#3 [2nd / 3rd] ST < > NXT



31. Use the < > to underline 2nd or 3rd. This will determine when the third Wink is to be sent. Press NXT to display:

WINK DELAY DURATION [10 to 990 ms]  
#3 300 200 < > NXT



32. Use the < > softkeys and the Keypad to enter values, then press NXT to display the CUT-THRU WINK screen. CUT-THRU WINK will automatically respond to STP, ST2P and ST3P commands.

CUT-THRU DELAY DURATION [10 to 990 ms]  
WINK 300 200 < > NXT



33. Use the < > softkeys and the Keypad to enter values for the CUT-THRU WINK. Then press NXT to return to the main SIG/WINK screen:

XMT SIG STATES WINK OR CUT-THRU  
#1 [ON-HOOK] < > EDIT



**NOTE:** The above screen also displays real-time supervision status of the DS0 being monitored on the receiver chosen (see DS0 Measurements page 5 to select RCVR1 or RCVR2). Currently, the above screen is reading an ON HOOK status. As the telephone call progresses, the screen will display a variety of messages including: - ON HOOK - WINK 1 DELAY - GENERATING WINK 1- WAITING FOR KP- WAITING FOR ST, etc.....

### Editing Telephone Numbers

Sending telephone numbers may require editing certain parameters specific to MF, DTMF, and DP (Dial Pulse). Edit screens will vary depending if MF, DTMF or DP is chosen. This section provides screens for editing telephone number parameters for direct dialing (setting up calls manually), and programmed sequences (storing up to 16 pre-programmed telephone numbers).

- A. Direct Dial (Begins with Step 1)
- B. Programmed (Begins with Step 30)

#### A. EDITS for Direct Dial

- Press the PHONE No. function key to display the opening screen. Use the < > softkeys to underline DIRECT:

XMT PHONE	<u>DIRECT</u>	PROGRAMMED
#1 NO.	EDIT < > ENTR	

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- Press the EDIT softkey (F2) to display the screen below. Use the < > softkeys to choose MF, DTMF or Dial Pulse (DP):

MF	DTMF	DP
< > NXT		

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If MF is chosen go to step 3.

If DTMF is chosen go to step 6.

If DP is chosen, go to step 12.

If MF is chosen:

- Press NXT to scroll to the LEVEL parameter screen. Use the < > softkeys and the keypad to enter the level:

MF	LEVEL (dBm0) [range 0 to -30]
-20	< > NXT

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- Press NXT to scroll to the digit timing screen. Use the < > softkeys and the keypad to enter the desired timing values:

MF	DIGIT	INTERDIGIT	[30-99 ms]
50 ms	50 ms	< > NXT	

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- Press NXT to scroll to the ON/OFF Hook signaling bit definition screen:

MF	AB	AB
Ø:00	:11	< > NXT

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If DTMF is chosen:

- Press NXT to scroll to the LEVEL parameter screen. Use the < > softkeys and the keypad to enter the desired level:

DTMF LEVEL (dBm0) [range 0 to -30]  
 -20 < > NXT

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- Press NXT to scroll to the digit timing screen. Use the < > softkeys and the keypad to enter the desired timing values:

DTMF DIGIT INTERDIGIT [30-99 ms]  
 50 ms 50 ms < > NXT

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- Press NXT to scroll to the signaling supervision screen:

DTMF FX/LS FX/GS E&M  
 EDIT < > NXT

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- Use the < > softkeys to underline FX/LS (Loop Start), FX/GS (Ground Start), or E&M.
- Use the EDIT softkey to enter the ON/OFF hook definitions. For example if FX/GS is underlined and EDIT is pressed, the screen below will be displayed. Use the < > softkeys and the keypad to enter 0 or 1.

MF AB AB AB  
 0:00 :11 :00 < . > NXT

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This field appears only when FX/GS is selected in the previous screen

↕ = defines the transition state

- Press NXT to return to the opening telephone number screen:

XMT PHONE DIRECT PROGRAMMED  
 #1 NO. EDIT < > ENTR

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If DP is chosen:

- Press NXT to scroll to the Make/Break ratio screen. Use the < > softkeys and the keypad to enter the desired ratio:

DP BREAK [range 30 to 80%]  
 61% < > NXT

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13. Press NXT to scroll to the dial pulse rate screen. Use the < > softkeys and the keypad to enter the desired rate:

DP	RATE	[range 8 to 22 pps]
	10 PPS	< > NXT

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14. Press NXT to display the interdigit delay screen. Use the < > softkeys and the keypad to enter digits.

DP	INTERDIGIT DELAY	[250-990 ms]
	500 ms	< > NXT

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15. Press NXT to display the ON/OFF hook definition screen:

DP	AB	AB
	Ø:00	:11 < > NXT

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16. Press NXT to return to the opening telephone number screen:

XMT PHONE	<u>DIRECT</u>	PROGRAMMED
#1 NO.	EDIT < > ENTR	

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### B. Edit Screens for PROGRAMMED Dialing

There are 16 storage locations for telephone number sequences. All of these pre-programmed numbers can be edited.

17. Press the PHONE No. function key to display the opening screen. Use the < > softkeys to underline PROGRAMMED:

XMT PHONE	DIRECT	<u>PROGRAMMED</u>
#1 NO.	< > ENTR	

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18. Press the ENTER softkey (F5) to display the first (#1) of sixteen pre-programmed telephone number screens:

MF Ø	[20205551212]
#1	-20 dBm0 50 ms Ø EDIT GO NXT

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19. Use the NXT softkey (F5) to scroll to the telephone number to be changed or edited, for example MF #7:

MF Ø	[408012345678]
#7	-20dBm0 50 ms Ø EDIT GO NXT

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If MF is chosen go to step 20.

If DTMF is chosen go to step 28.

If DP is chosen, go to step 35.

If MF is chosen:

20. Press EDIT to display screen below and underline choice with the < > softkeys, for example MF:

No.	MF	DTMF	DP
#7	LAST #	<	> NXT

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**NOTE:** The LAST # softkey (F1) will make the current telephone sequence the last in the series. In other words, by pressing LAST # in the screen above, scrolling with NXT will be limited to #1 through #7 (instead of #1 through #16). In order to reinstate each screen (#8 through #16), use the EDIT key shown below. This will let you scroll through edit screens with the NXT softkey until the previously pre-programmed telephone number reappears.

No.	End of telephone No. sequence
#7	EDIT NXT

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21. Use the NXT softkey (F5) to scroll to the Level parameter screen and use the < > and keypad to enter levels.

MF	LEVEL (dBm0) [range 0 to -30]
#7	-20 < > NXT

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22. Press the NXT softkey to display the digit timing screen below. Use the < > softkeys and the keypad to enter the desired values.

MF	DIGIT	INTERDIGIT	[30-99 ms]
#7	50 ms	50 ms	< > NXT

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23. Press NXT to display the ON/OFF hook definition screen. Use the < > softkeys and the keypad to enter 0 and 1 for the A/B signaling bits:

MF	AB	AB
#7	0:00	:11 < > NXT

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24. Press NXT to display the telephone number screen:

MF Ø[408Ø12345678] \_  
#7 W BLNK < > NXT

25. Use the < > softkeys to move the flashing underline, and the keypad to enter the ST, KP, ON/OFF hook, Wait For Wink command, and the digits. (The W softkey will enter a wait-for-wink).

**NOTE:** Use the green ALT key next to softkey F5 to enter all alternate symbols written in green on the keypad. To enter KP, first press the ALT key (key will light) then press No. 2. ON and OFF hooks are entered with ALT and No. 0 and No. 8 respectively. ALT P will enter a one second pause symbol (diamond). The W softkey will enter a wait-for-wink command.

26. Use the BLNK (Blank) softkey to erase all digits past the flashing underline. For example, in the screen below, 5678 will be changed to 0000 by proceeding as follows:

- a) Moving the underline to the 5, and then

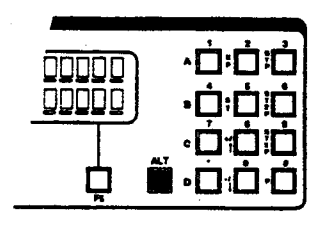
MF Ø[408Ø12345678] \_  
#7 W BLNK < > NXT

- b) Pressing BLNK to erase 5678:

MF Ø[408Ø1234  
#7 W BLNK < > NXT

- c) Using the < > softkeys to move the flashing underline to the right side of 4, and use the keypad to enter 0000ST:

MF Ø[408Ø12340000]  
#7 W BLNK < > NXT



27. If all digits and commands are entered correctly, press NXT to store the sequence into MF #7  
(Note that -20 dBm0 50 ms reappears when MF #7 is entered & stored):

MF	Ø[408Ø12340000]			
#7	-20dBm0 50 ms	Ø	EDIT	GO NXT

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If DTMF is chosen: follow steps 17-20, then,

28. Press NXT to scroll to the LEVEL parameter screen. Use the < > softkeys and the keypad to enter the desired level:

DTMF	LEVEL (dBm0) [range 0 to -30]			
#7	-20	<	>	NXT

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29. Press NXT to scroll to the digit timing screen. Use the < > softkeys and the keypad to enter the desired timing values:

DTMF	DIGIT	INTERDIGIT	[30-99 ms]	
#7	50 ms	50 ms	<	> NXT

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30. Press NXT to scroll to the signaling supervision screen:

DTMF	<u>FX/LS</u>	<u>FX/GS</u>	<u>E&amp;M</u>
#8	EDIT < > NXT		

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31. Use the < > softkeys to underline FX/LS (Loop Start), FX/GS (Ground Start), or E&M.
32. Use the EDIT softkey to enter the ON/OFF hook definitions. For example if FX/GS is underlined and EDIT is pressed, the screen below will be displayed. Use the < > softkeys and the keypad to enter 0 or 1.

DTMF	AB	AB	AB
#7	Ø:00	:11	:00 < . > NXT

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♦ = defines the transition state

33. Press NXT to display the telephone number screen. Use the < softkey and the keypad to enter the telephone number (refer to steps 25-29). The W softkey is used to enter a wait-for-wink command.

DTMF	Ø	408Ø12345678		
#7	W	BLNK	<	NXT

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34. If all digits and commands are entered correctly, press NXT to store the sequence into DTMF #7:

DTMF Ø	408@12345678
#7	-20 dBm0 FX/GS Ø EDIT GO NXT

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If DP is chosen: follow steps 17-20, then,

35. Press NXT to scroll to the Make/Break ratio screen. Use the < > softkeys and the keypad to enter the desired ratio:

DP	BREAK	[range 30 to 80%]
#7	61%	< > NXT

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36. Press NXT to scroll to the dial pulse rate screen. Use the < > softkeys and the keypad to enter the desired rate:

DP	RATE	[range 8 to 22 pps]
#7	10 PPS	< > NXT

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37. Press NXT to display the interdigit delay screen. Use the < > softkeys and the keypad to enter the desired digits.

DP	INTERDIGIT DELAY	[250-990 ms]
#7	500 ms	< > NXT

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38. Press NXT to display the ON/OFF hook definition screen:

DP	AB	AB
#7	Ø:00	:00 < > NXT

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39. Press NXT to display the telephone number screen. Use the < > softkeys and the keypad to enter the desired telephone number (refer to steps 25-29). The W softkey is used to enter a wait-for-wink command.

DP Ø	408@12345678
#7	W BLNK < > NXT

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40. If all digits and commands are entered correctly, press NXT to store the sequence into DP #7:

DP Ø	408@12345678
#7	B=61% 10 PPS Ø EDIT GO NXT

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